

Reconsideration of this Application is respectfully requested in light of the following remarks. Claims 1- 20 are pending in the application, among which claims 1-3, 6-13 and 18-20 are withdrawn from consideration subject to restriction requirement. Among the claims being considered, claims 4 and 14 are independent claims.

Description of the Invention

This Application is directed to a liquid crystal display (LCD) wire that can withstand the unintended chemical reaction. The invention claimed in this Application improves the reliability and durability of the gate wires and data wires.

In manufacturing an LCD, matrix of long wires are formed on a substrate. The wires are narrow and long and formed by photolithography process. In order to overcome the high resistance inherent in the long and narrow wires, wires are made of low resistance materials. However, the low resistance materials are very vulnerable to chemical reaction. Therefore, the data wires or the gate wires may be subject to unintended chemical reaction in the subsequent etching process, even though those wires are protected by the passivation layers or other insulation layers. Especially, when etching indium tin oxide (ITO) layers to form a pixel electrode, the ITO etchant tends to penetrate the passivation layer and erode the data wire layer, causing problems of disconnected data wires and gate wires.

The invention of the present Application is directed to resolve these problems. The present Application solves this problem by providing a novel structure to the data wire and the gate wire.

Rejections Under 35 U.S.C. § 103

On page 2 of Office Action, the Examiner rejected claim 4 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,043,859 issued to Maeda ("Maeda") in view of JP 8-254680. Although responding to the Examiner's rejection under 35 U.S.C. §103 over Maeda, Applicants reserve rights to swear behind the Maeda reference.

The Examiner alleges that Maeda discloses at col. 4, lines 20-23 that the metal film (data wire or gate wire) are made of molybdenum or molybdenum alloy.

The Examiner admits that Maeda does not expressly disclose using the supplementary layer, but Maeda discloses at col. 6, lines 5-34 that to assure contact reliability, the nitride film having superior corrosion resistance is used, and the function of the nitride film is the superior corrosion resistance to attain a good protection for the data line and the gate line.

The Examiner further alleges that JP 8-254680 also discloses that the metal lines (scanning lines and signal lines) made of molybdenum (Mo), and have the second supplementary layer, and such metal layers have a good protection to prevent influence. And the Examiner alleges that the supplementary layer is located either on or under the entire wire, that is to increase the thickness of the metal wire, so as to improve the corrosion resistance, so that decreasing the wire connection.

Finally, the Examiner alleges that it would have been obvious to those skilled in the art at the time the invention was made to use supplementary layer which is the molybdenum nitride or molybdenum alloy nitride film located on or under the entire wire as claimed in claim 4 for improving the corrosion resistance and decreasing the wire disconnection.

Applicants disagree with the Examiner and submits that the Examiner has failed to establish a prima-facie case of obviousness.

First, the Maeda reference does not recognize the problems that the invention in the present Application solves. The invention of Maeda is directed to improving the reliability of the pad area. Maeda's invention points out the problems of the contact area's vulnerability to external moisture and heat induced oxidation problem by the thermal compression bonding when attaching ACF and TCP.

On the other hand, the present Application is directed to enhance the reliability of the data wire, especially from the possible chemical reaction when fabricating ITO layer after forming the data wire. It is particularly important when the wire is made of molybdenum or its alloy and the acidic ITO etchant is used.

The problem that each invention is directed to is totally different. Maeda tries to enhance the reliability of the pad/external connection area that is exposed to ambient air and moisture and excessive heat and pressure suffering from thermal compression bonding. The present Application is directed to enhancing the data and gate wires protected by the passivation layer and insulation layer from the ambient atmosphere, but maybe vulnerable the chemical reaction during the subsequent etching process.

Therefore, the teachings of Maeda would not have suggested the invention claimed in the present Application to one of ordinary skill in the art, because Maeda did not even suggest the problems addressed by the present Application.

Second, Maeda does not provide any teachings or incentives to combine with JP 8-254680. It is a well established principle that obviousness cannot be established by combining the teachings of the prior art to produced the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

As discussed previously, Maeda is directed to a totally different subject from the invention claimed in the present Application. Therefore, there is neither suggestion nor incentives to combine Maeda with the other cited Japanese reference. Without a such a showing in Maeda, the Examiner failed to establish the prima facie case of obviousness.

Third, even the combination of Maeda and JP 8-254680 does not render the invention of the present application obvious. To the Applicants' best understanding, JP 8-254680 is directed to reducing the electric resistance of the wiring. To achieve this purpose, the scanning line includes a first metallic layer of pure aluminum and a second metallic layer of molybdenum. Therefore, even the combination of Maeda and JP 8-254680 would not render obvious the inventions of the present Application.

Finally, Maeda appears to teach away the invention of the present Application. Even in discussing the improvement of the pad/external contact area, Maeda describes that poor corrosion resistant material, such as molybdenum and tungsten, are not suitable replacements for chrome. Therefore, one of ordinary skill in the art with the teaching of Maeda would not render the invention of the present Application obvious.

Therefore, claim 4 is patentable over Maeda and JP 8-254680. Likewise, claim 5 that is dependent from claim 4 is also patentable over Maeda and JP 8-254680.

The Examiner rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Maeda and JP 8-254680 as applied to claim 4 above, and further in view of U.S. Patent No. 6,011,277 issued to Yamazaki.

However, as discussed previously, claim 4 is patentable over Maeda and JP 8-254680. Claim 5 that is dependent from claim 4 is also patentable over Maeda and JP 8-254680. Because claim 5 is patentable over the primary references, it is not necessary to further

consider the secondary reference, because even the combination of the three references cannot render the claim 5 obvious.

On page 4 of the office action, the Examiner rejected claim 14 under 35 U.S.C. §103(a) as being unpatentable over Applicants' admitted prior art, in view of Maeda and JP 8-254680. Applicants do not agree with the Examiner's allegation of admission of certain aspects.

Regarding the aspect of the invention in the present Application that data wire is made of either molybdenum or molybdenum alloy, and a supplementary data wire is located either on or under the entire data wire and made of either molybdenum nitride or molybdenum alloy nitride, the Examiner further alleges that it would have been obvious to those skilled in the art at the time of invention was made to use the data wire such as the molybdenum or molybdenum alloy and supplementary data wire located on or under the entire data wire as claimed in claim 14 for improving the corrosion resistance and decreasing the wire disconnection.

However, as discussed previously with regard to claim 4, the Examiner fails to establish a prima facie case of obviousness and even the combination of the alleges prior art references cannot render the invention of claim 14 in the present Application obvious.

Therefore, claim 14 is patentable over alleged prior art, Maeda and JP 8-254680. Likewise, claims 15-17 that are dependent from claim 14 are also patentable over alleged prior art, Maeda and JP 8-254680.

On page 5 of the Office Action, the Examiner rejected claims 15-17 under 35 U.S.C. §103(a) as being unpatentable over Applicants' admitted prior art, Maeda and JP 8-254680 as applied to claim 14 above, and further in view of Yamazaki.

However, as discussed previously, claims 15-17 are now dependent from claim 14 that is patentable over the alleged prior art, Maeda and JP 8-254680. It does not appear necessary to further consider the secondary reference Yamazaki, because claims 15-17 are patentable over the primary reference. Therefore, claims 15-17 are patentable over the references of record, because even combined with Yamazaki, the other three references cannot render obvious the aspects disclosed in the claim 14 that is incorporated in all the claims 15-17.

As such, it is submitted that the invention recited in claims 4, 5 and 14-17 is patentable over the cited references. A withdrawal of all the outstanding rejections and issuance of claims 4, 5 and 14-17 are therefore respectfully requested.

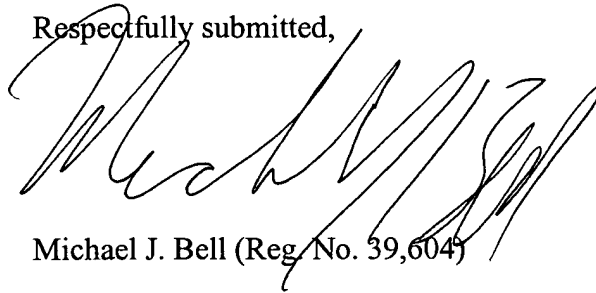
Conclusion

Applicants respectfully submit that the foregoing remarks demonstrate that entry of these amendments places the present application in condition for allowance, or in the alternative, better form for appeal. All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite

prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Michael J. Bell', is written over the typed name below.

Michael J. Bell (Reg. No. 39,604)

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